

WHAT IS CLAIMED IS:

1. A signal processing apparatus, comprising:

an input attribute determination section for determining an input attribute representing at least one of a type of an audio codec, a sampling frequency and a number of channels of an input signal; and

an input signal processing section for processing the input signal,

wherein the input signal processing section determines whether the input attribute has been changed based on a determination result provided by the input attribute determination section; and when a calculation remainder is generated in the input signal processing section by the change in the input attribute, the input signal processing section assigns at least a part of the calculation remainder to processing of the input signal.

2. A signal processing apparatus according to claim 1, wherein when the input attribute is changed so as to reduce the sampling frequency of the input signal, the input signal processing section assigns at least a part of the calculation remainder generated by the reduction in the sampling frequency to the processing of the input signal.

3. A signal processing apparatus according to claim 1, wherein when the input attribute is changed so as to reduce the number of channels of the input signal, the input signal processing section assigns at least a part of the calculation remainder generated by the reduction in the number of channels to the processing of the input signal.

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4. A signal processing apparatus according to claim 1, wherein when the input attribute is changed so as to reduce a calculation amount based on the audio codec of the input signal, the input signal processing section assigns at least a part of the calculation remainder generated by the reduction in the calculation amount to the processing of the input signal.

5. A signal processing apparatus according to claim 1, wherein where a maximum sampling frequency is  $f_s$ , the input signal processing section controls the processing of the input signal so that a calculation time of the input signal is  $1/f_s$  or more regardless of a change in the sampling frequency.

6. A signal processing apparatus according to claim 1, wherein where a maximum number of input channels is  $N_{max}$  and a total calculation amount of the input signal processing section when the number of input channels is maximum is  $C_{max}$ , the input signal processing section controls the processing of the input signal so that the total calculation amount of the input signal is  $C_{max} \cdot N_x / N_{max}$  or more when the number of input channels is  $N_x$ , where  $N_x$  is an arbitrary integer in the range of 1 through  $N_{max}$ .

7. A signal processing apparatus according to claim 1, wherein the input signal processing section controls the processing of the input signal so that a total calculation amount of the input signal processing section is substantially constant regardless of the change in the input attribute.

8. A signal processing apparatus according to claim 1,

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wherein the input signal processing section includes a plurality of programs executed by a digital signal processor or a microprocessor unit, and the input signal processing section controls a calculation amount thereof by switching the plurality of programs in accordance with the determination result provided by the input attribute determination section.

9. A signal processing apparatus according to claim 8, wherein when the input attribute is changed, the input signal processing section initializes one of the plurality of programs in use.

10. A signal processing apparatus according to claim 1, wherein:

input attribute information representing the input attribute is recorded on a recording medium, and

the input attribute determination section determines the input attribute based on the input attribute information recorded on the recording medium.

11. A signal processing apparatus according to claim 1, wherein the input attribute determination section receives an attribute signal which is output from a decoder for generating an audio signal, and determines the input attribute based on the attribute signal.

12. A signal processing apparatus according to claim 1, wherein:

the input attribute determination section includes a decoder for receiving a bit stream signal from a sound source as an input signal and generating an audio signal by decoding the bit stream signal, and

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the decoder determines the input attribute during decoding of the bit stream signal.

13. A signal processing apparatus according to claim 1, wherein the input attribute determination section includes an input determination circuit for receiving a plurality of audio signals as the input signal and determining the input attribute by detecting a level of each of the plurality of audio signals.

14. A signal processing apparatus according to claim 1, wherein:

the input attribute determination section includes an attribute input circuit for allowing a user to input, to the signal processing apparatus, input attribute information representing the input attribute, and

the attribute input circuit determines the input attribute based on the input attribute information.

15. A signal processing apparatus according to claim 1, wherein the input signal processing section includes:

a transfer function correction circuit for mainly reproducing an acoustic characteristic of a direct sound component from a plurality of virtual speakers provided at predetermined positions to each of the ears of the listener, and

a reflection circuit for mainly reproducing an acoustic characteristic of a reflection component from the plurality of virtual speakers to each of the ears of the listener.

16. A signal processing apparatus according to claim 15, wherein the input signal processing section adds an output

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from the transfer function correction circuit and an output from the reflection circuit to generate an addition signal, and inputs the addition signal to two speakers or headphones, to perform sound image localization control so that an acoustic characteristic of a sound reproduced by the two speakers or the headphones is substantially equal to an acoustic characteristic of a sound reproduced by the plurality of virtual speakers.

17. A signal processing apparatus according to claim 15, wherein the input signal processing section inputs an output from the transfer function correction circuit to the reflection circuit and inputs an output from the reflection circuit to two speakers or headphones, to perform sound image localization control so that an acoustic characteristic of a sound reproduced by the two speakers or the headphones is substantially equal to an acoustic characteristic of a sound reproduced by the plurality of virtual speakers.

18. A signal processing apparatus according to claim 15, wherein:

the transfer function correction circuit includes a plurality of digital filters, and

the input signal processing section controls the processing of the input signal by adjusting a number of taps of at least one of the plurality of digital filters in accordance with the change in the input attribute.

19. A signal processing apparatus according to claim 15, wherein:

the reflection circuit includes a plurality of delay devices and a plurality of level adjusters which are respectively connected in series to the plurality of delay

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devices, and

the input signal processing section controls the processing of the input signal by adjusting a number of the plurality of delay devices and a number of the plurality of level adjusters in accordance with the change in the input attribute.

20. A signal processing apparatus according to claim 1, wherein when the input signal is two channel audio signals including a front L signal and a front R signal, the input signal processing section adds the front L signal and the front R signal and adjusts the level of the resultant signal to generate a center signal, and performs sound image localization control of the center signal.

21. A signal processing apparatus according to claim 1, wherein when the input signal is two channel audio signals including a front L signal and a front R signal, the input signal processing section obtains a difference between the front L signal and the front R signal to generate a surround signal, and performs sound image localization control of the surround signal.

22. A signal processing apparatus according to claim 1, wherein when the input signal is 5.1-channel or 5-channel audio signals including a surround L signal and a surround R signal, the input signal processing section adds the surround L signal and the surround R signal and adjusts the level of the resultant signal to generate a surround back signal, and performs sound image localization control of the surround back signal.

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